

Assignment Quiz 3  
October 10, 1997

Instructor: B.L. Daku  
Time: 15 minutes  
Note: No aids

Name:  
Student Number:

1. If

$$x(n) = \{ \dots, 0, 1, 2, 1, 1, 3, 4, 1, 0, \dots \}$$

↑

$$y(n) = \{ \dots, 0, 1, 4, 3, 1, 1, 2, 1, 0, \dots \},$$

↑

what is the simplest equation for  $y(n)$  in terms of  $x(n)$ ?

$y(n) = x(-n-2)$

$$x(-n) = \{ 0, 1, 4, 3, 1, 1, 2, 1, 0, \dots \}$$

↑

$$x(-n-2) = \{ 0, 1, 4, 3, 1, 1, 2, 1, 0, \dots \}$$

$$= y(n)$$

1

X

2. Compute the convolution  $y(n) = x(n) * h(n)$  of

$$x(n) = \sum_{k=-\infty}^n \delta(k) - u(n-4)$$

$$h(n) = \sum_{k=0}^{\infty} \delta(n-k-2) - u(n-8) + u(n-11) - u(n-17)$$

$$x(n) = \{ 0, 1, 0, 0, \dots \}$$

$$h(n-2) = \{ 0, 0, 1, 0, 0, \dots \}$$

$$u(n-4) = \{ 0, 0, 0, 0, 1, 0, \dots \}$$

$$u(n-8) = \{ 0, 0, 0, 0, 0, 0, 0, 1, 0, \dots \}$$

$$\dots x(n) = \{ 0, 1, 0, 0, 0, -1, \dots \}$$

$$u(n-11) = \{ 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, \dots \}$$

$$u(n-17) = \{ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, \dots \}$$

$h(n) = \{ 0, 0, 1, 0, 0, 0, -1, -1, -1, -2, -2, -2, -2, -3 \}$

$$h(-4) = \{ -3, -2, -2, -2, -2, -2, -1, -1, -1, 0, 0, 0, 0, 1, 0, 0, \dots \}$$

$$\begin{array}{c|cccccccccccccccc} y(n) & 0 & 0 & 1 & 0 & 0 & -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 \\ \hline n & 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 \end{array}$$

X \* out of time



Instructor: B.L. Daku  
Time: 15 minutes  
Note: No aids

Name:  
Student Number:

1. Evaluate the convolution,  $y(n) = (n+1)u(n) * \delta(n-1)$ , giving the result in equation form with no summation symbols. Show all your work.

$$\begin{aligned} y(n) &= (n+1) u(n) * f(n-1) \\ &= ((n-1)+1) u(n-1) \end{aligned}$$

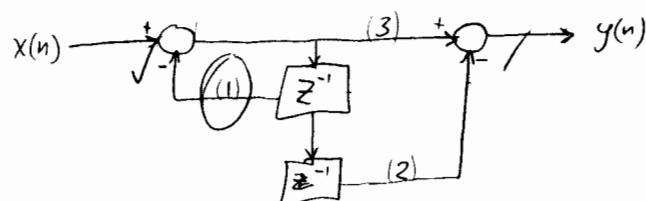
$$y(n) = n u(n)$$

$$\begin{array}{c|cc|cc} y(n) & 0 & 1 & 2 & \dots \\ \hline n & 0 & 1 & 2 & \dots \end{array}$$

2. Determine the direct form II realization for the system

$$y(n) + y(n-1) - 3x(n) + 2x(n-2) = 0.$$

$$y(n) = -y(n-1) + 3x(n) - 2x(n-2)$$



5